

# 24

## PRODUCTION

*You can run but you cannot hide from logistics.*  
Truism

### 24.1 LOGISTICS OBJECTIVES

The logistics objectives during the production phase are to ensure that approved supportability design requirements, i.e., such as Reliability and Maintainability (R&M), are achieved in the early production articles; and they also ensure that planned logistics support resources are defined and adequately funded to achieve the system readiness objectives. The Logistics Manager (LM) should insist on evidence of demonstrated R&M, a producible design, proven repeatability of manufacturing procedures and processes, and logistics support verified in operational testing. (See Table 24A.)

The production phase is an extremely challenging period. Some programs may not succeed in production, in spite of having passed the required milestone design reviews. Reliability and support characteristics that are not “designed-in” cannot be “tested-in” or “produced-in.” There may be unexpected failures during the test program that require design changes. The introduction of these changes can impact quality, producibility, supportability, and can result in program schedule slippages. The LM must exercise strong configuration management discipline during this transition period to ensure that the changes incorporated in the system are properly reflected in the support system deliverables.

<b>TABLE 24A</b> <b>SUPPORT ACTIVITIES DURING PRODUCTION</b>
<ul style="list-style-type: none"><li>• Verify R&amp;M objectives.</li><li>• Monitor production of prime and support hardware/software/GFE.</li><li>• Coordinate and provide all items of support.</li><li>• Update support and deployment planning.</li><li>• Obtain operational feedback ASAP.</li><li>• Consider logistics implications and testing of ECPs.</li><li>• Monitor training programs.</li></ul>

The transition process and early stages of production are impacted by:

- design maturity – a qualitative assessment of the implementation of concurrent and effective design policy;
- test stability – the absence or near absence of anomalies in the failure data from development testing; and
- certification of the manufacturing processes – includes both design for production and proof of process. (Proof of process occurs during pilot production, low-rate initial production, or other “proof of concept” methods used prior to rate buildup.)

## **24.2 VARIABILITY-REDUCTION PROCESS**

Variability-Reduction Process (VRP) is a disciplined design and manufacturing approach aimed at meeting customer expectations and improving the development, manufacturing, and repair processes while minimizing time and cost. The traditional approach to improving a product is tightening tolerances and increasing inspections. The alternative VRP approach seeks to reduce causes of harmful variation in the production process and minimize the effects of the variation on reliability and repeatability of the system.

### **24.2.1 Support Readiness Reviews**

The PM or LM should consider support readiness reviews to address all logistics elements. The number of reviews and the topic sequence depend on the nature of the program. Depending on the system under consideration and the phase of the program, some elements will be more critical than others. The emphasis on key program issues will have to be tailored accordingly.

Early support readiness reviews should be incorporated in Preliminary Design Reviews (PDRs) and Critical Design Reviews (CDRs), where the LM has an active role in establishing system and development specifications. Logistics risk areas that were revealed during the PDR and CDR should be prime considerations during later support readiness reviews. The LM should participate in these reviews through an appropriate Integrated Product Team (IPT).

### **24.2.2 Tasks, Activities and Deliverables**

The quality and validity of many of the products of the supportability analyses are put to the test in the production phase. Early validation of the output from the analyses provides confidence in the quality of the analytical side of the process. As the program enters the production phase, a lengthy list of problems requiring resolution by the LM may surface. Examples of these problems include inadequate support equipment; late ordering of spares; inadequate training; documentation that is not to the latest configuration; un-

proven facilities; and insufficient sets of check-out equipment to simultaneously support production testing, quality assurance standards, and deployment.

### **24.2.3 Support Requirements Review during the Production Phase**

The LM should take stock of the lessons learned from the results of the Engineering and Manufacturing Development (EMD) phase by conducting a support requirements review before recommending that the program proceed to the production phase. Some questions to ask follow:

- Have critical supportability design deficiencies identified during Development Test and Evaluation (DT&E) and Operational Test and Evaluation (OT&E) been corrected, or have solutions been identified that can be applied before deployment?
- Have logistics elements (support equipment, technical manuals, etc.) been fully evaluated in a representative operational environment?
- Have deficiencies been corrected, or can they be corrected before deployment?
- Have quantitative requirements for logistics elements (e.g., maintenance staffing and initial provisioning) been determined?
- Is sufficient funding included in the Program Objective Memorandum (POM)?
- Can the staffing required to support the system be satisfied by the Services personnel projections?
- Will production lead times for the logistics elements support the planned production and deployment schedules?
- Have tests and simulations confirmed the attainability of system readiness thresholds within the target levels for Operations and Support (O&S) costs?
- Have plans for interim contractor support, if applicable, and transition to organic support been prepared?

If these issues have not been resolved, the LM should develop a recovery plan and/or recommend further system development.

### **24.2.4 Logistics Manager's Priority Tasks during the Production Phase**

The primary purpose of the acquisition process is to deploy systems that not only perform their intended functions but also are ready to perform these functions repeatedly without burdensome maintenance and logistics efforts. The successful deployment of a reliable

and supportable system requires that the LM provide strict watchdog management during the production phase to ensure that adequate technical engineering, manufacturing disciplines, and management systems are applied to the logistics elements and supportability features of the system. Priority items for the LM include:

- providing timely and adequate funding for all logistics elements;
- involving logistics specialists in the preparation of comprehensive hardware and software design specifications;
- continuing to conduct supportability analyses;
- ensuring logistics input to configuration control and the comprehensive assessment of the impact of changes on all logistics elements; and
- establishing a technical management system for tracking support equipment reliability, configuration control, and compatibility with end item hardware/firmware/software.